FuelCom® 5080

Installation &
User manual

Automatic Tank Gauging System

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1 Summary

Thank you for choosing a 4tech AS product

The FuelCom® 5080 is based on a well proven and advanced technology, and designed to give a high performance solution for environmental and inventory management needs.
In order to comply with present and future requirements, the system has a flexible and modular architecture which is configurable on site.
The FuelCom® 5080 is intended for Ex-environment, and it is easy to install and use. It operates with a single point push and scroll button, or via RS232 communication ports. Remote communication is available via a built in analogue modem, or external GSM modem, or an Ethernet adapter.

With the FuelWin® software installed on your back office computer, FuelCom®5080 gives a new meaning to the words “Tank Management”. The 4tech hosted and web based server software collects data from any number of tank management systems in order to generate reports for planning the distribution, generating historical reports and managing alarms. The server software is an optional subscription service in combination with access to the 4tech support centre. For this and other web applications, contact 4tech AS.

4tech AS remains focused in providing quality monitoring systems for liquids, and look forward to help you with your present and future needs.

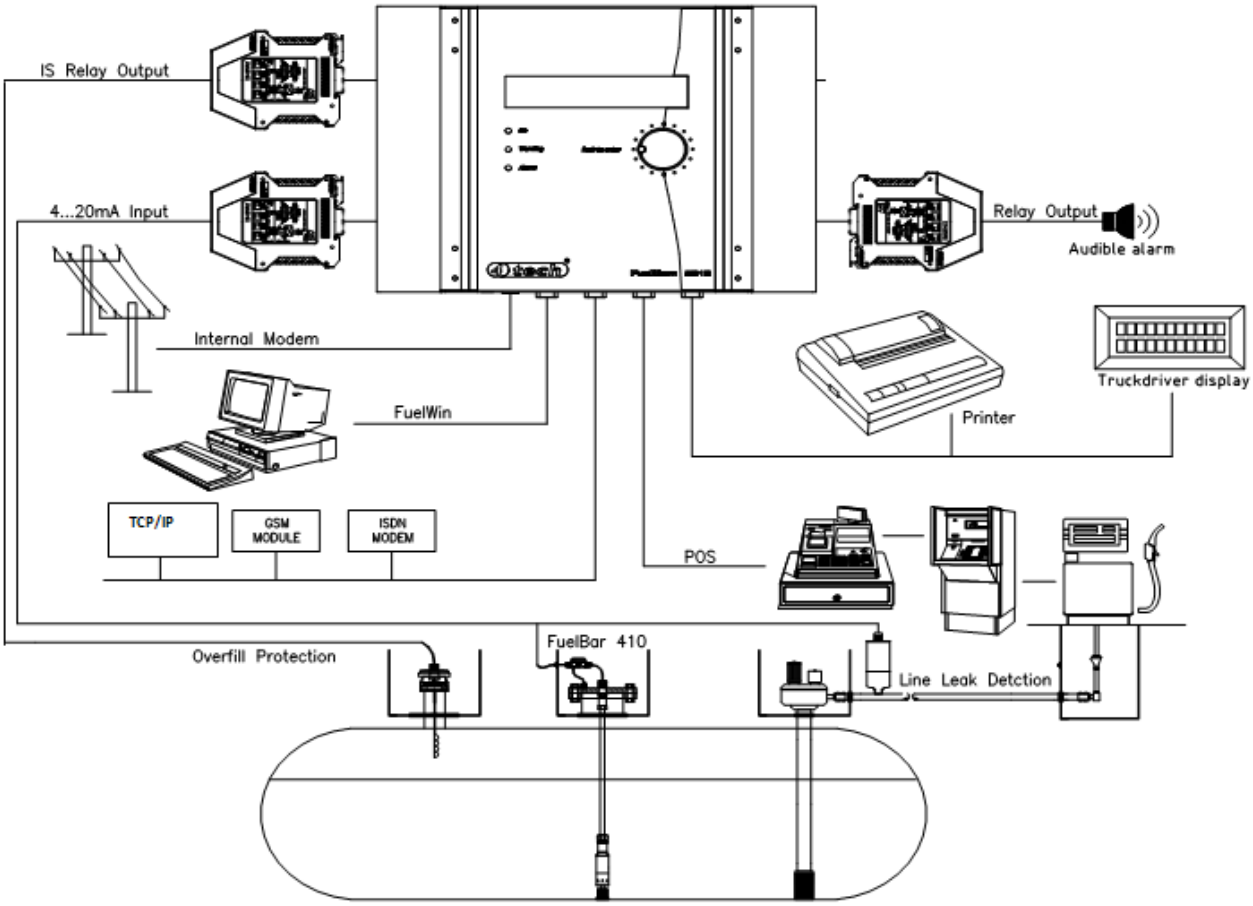
1.1 FC5080 System features:

- Up to 8 tanks
- Integrated standard analogue modem
- Easy upgradeable modular system
- 4x RS232 Com ports
- RS485 Local bus, support for 4 modules (optional 8)
- Monitoring of oil separator
- 4x40 character display, with user-friendly icon based menus, LED backlight and contrast control
- Scroll wheel and push buttons for navigation
- User data stored in data flash
- Local visual LED and audible alarm
- External 80 columns thermal printer (optional)
- Real-time clock
- Software upgrade through built-in bootloader
- Truck Driver Display (optional)
- 12Vdc power input, auto power save
- Ambient temperature sensor
- Optional external Ethernet adapter or ISDN modem
- Optional external GSM modem

1.2 Software functions:

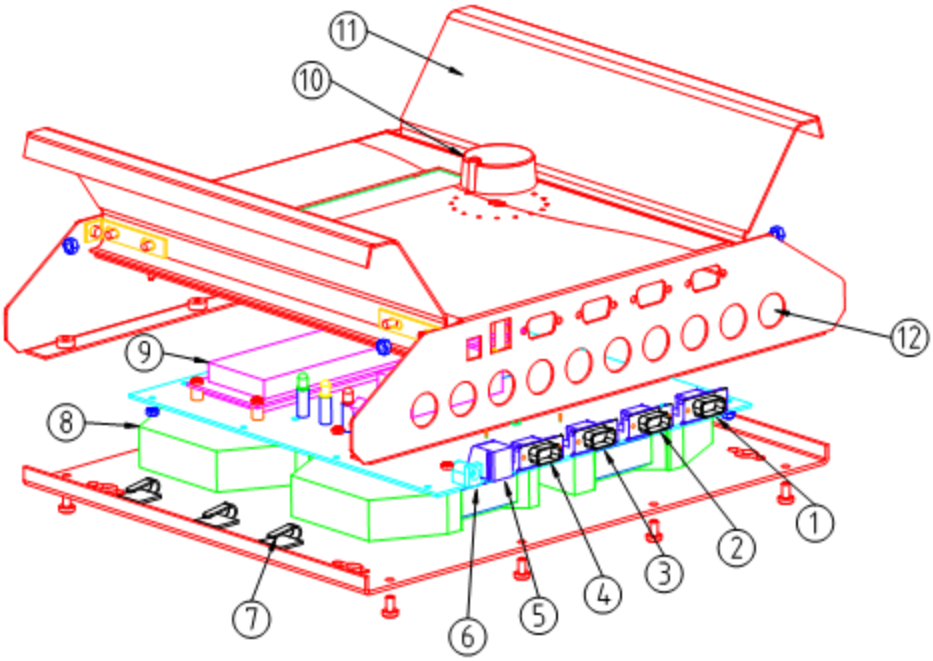
- Product level
- Product temperature
- Water detection.
- Automatic Leak detection.
- Programmable alarm limits.
- Automatic delivery reports.
- Automatic 24 hour inventory reports
- Volume reports
- POS interface
- Alarm History
- Tank calibration
- Periodic reports

2 Schematic Drawing of tank management system



3 FuelCom® Assembly Drawing

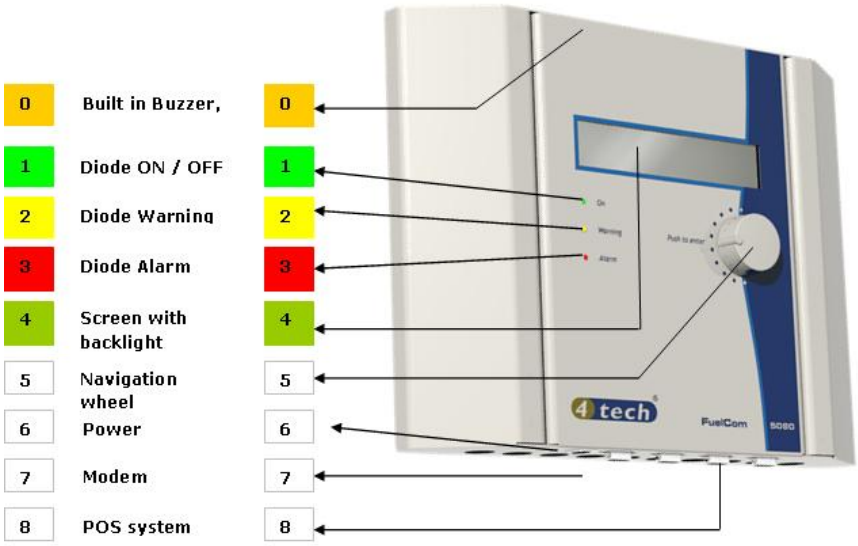
1. COM 4 FuelWin interface
2. COM 3 Selectable POS protocol
3. COM 2 GSM modem, ISDN,TCP/IP or FuelWin
4. COM 1 External printer /FuelWin
5. RJ45 modem line input
6. Power connector
7. Cable attachment clips
8. Up to 8 module slots
9. LCD 40x4 character
10. Navigating wheel
11. Module access door
12. Cable inlet



The following pos systems are known to utilize the FuelCom interface protocol and be connected to com port 1,2 or 4:

- Dresser Wayne, Nucleus
- Doms, PSS 5000

The FuelCom interface protocol documentation (FIP) is available on request.


0 Built in Buzzer, 0
1 Diode ON / OFF 1
2 Diode Warning 2
3 Diode Alarm 3
4 Screen with backlight 4
5 Navigation wheel 5
6 Power 6
7 Modem 7
8 POS system 8

3.1 Configuration:

The FuelCom® 5080 is a microcomputer based controller for tank gauging. Inside there are 4 slots for signal interface modules, where the number of preinstalled modules may vary. It is possible to order the FuelCom 5080 with AD424 modules for probe signal inputs, or special modules for oil separator or relay signal outputs. These modules are all intended for use together with equipment in explosive areas, and they are ATEX approved.

3.2 Safety note:

⚠ This symbol is used when the information is important for safety of the installation.

4 The AC Adapter

Each FuelCom® 5080 controller is delivered with an AC power adapter. The adapter handles input voltage spans from 100-240VAC. The output volt is a fixed 12 VDC / 18W. 12VDC output must not be exceeded.
The power adapter can be delivered with two different plug types:

Euro-plug

UK-plug

⚠ Always use the power supply which is delivered together with the controller unit!
This applies also if a controller unit is replaced.

5 Installation of the Control Unit

5.1 Mounting location

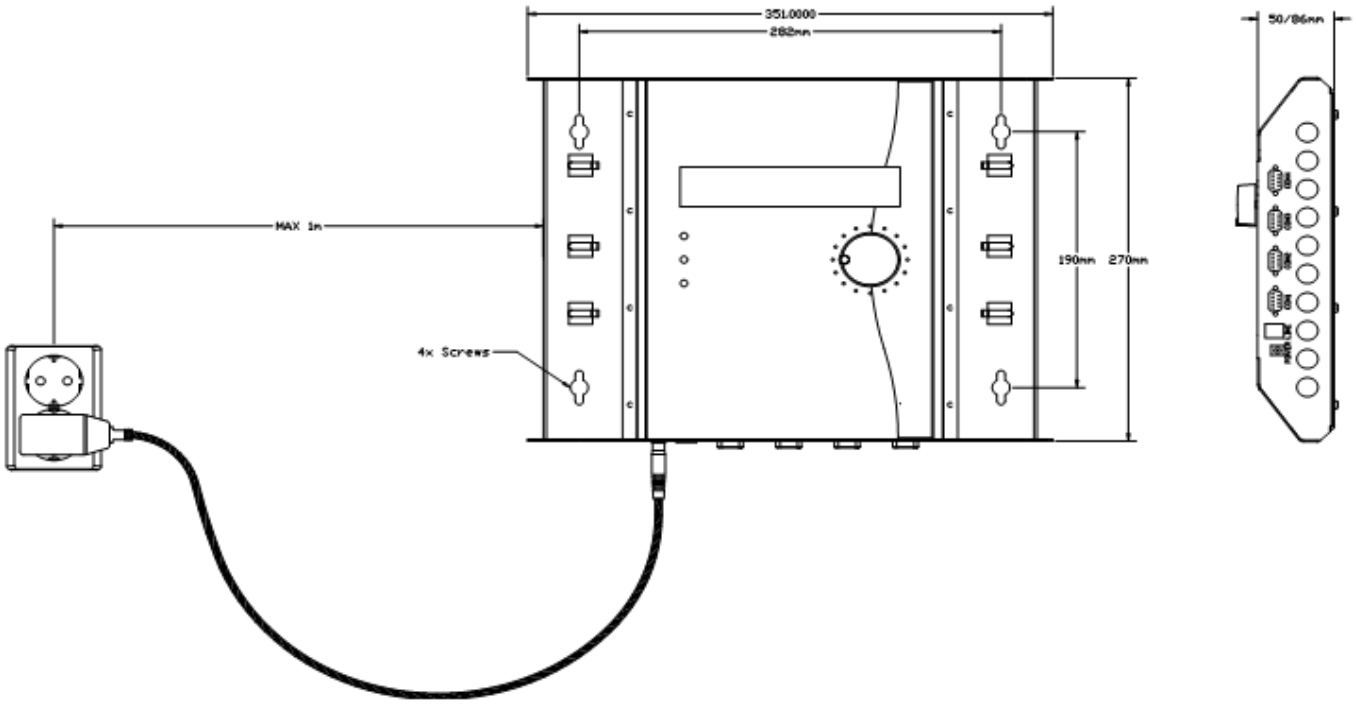
Note: The controller must be installed outside the Ex area!

Although the FC5080 is intended for Ex-applications, the controller itself cannot be placed in a hazardous zone. An indoor location in a safe area must be chosen, protected from vibration and extreme temperatures. The operating temperature range of the controller is 0 to 50 °C. The mounting location must be able to support the weight of the control unit, which fully equipped could exceed 4 kg. The control unit should not be mounted more than 1 metre from an AC power outlet. When deciding the actual installation place, please remember the space needed for probe sensor cables and communication cable for back office system.
For outdoor installation the control unit must be installed in a cabinet which protects the control unit from exposure to rain, humidity, temperature below 0 °C or above 50 °C, etc. Outdoor locations must be chosen outside the hazardous area. Please consult local regulations if necessary. As an option you may order an approved enclosure with built in heater from 4tech.

5.2 Installation of the control unit

Install the control unit with four screws using the pattern shown in Figure 01. Screws are provided with each control unit.

Fig. 01

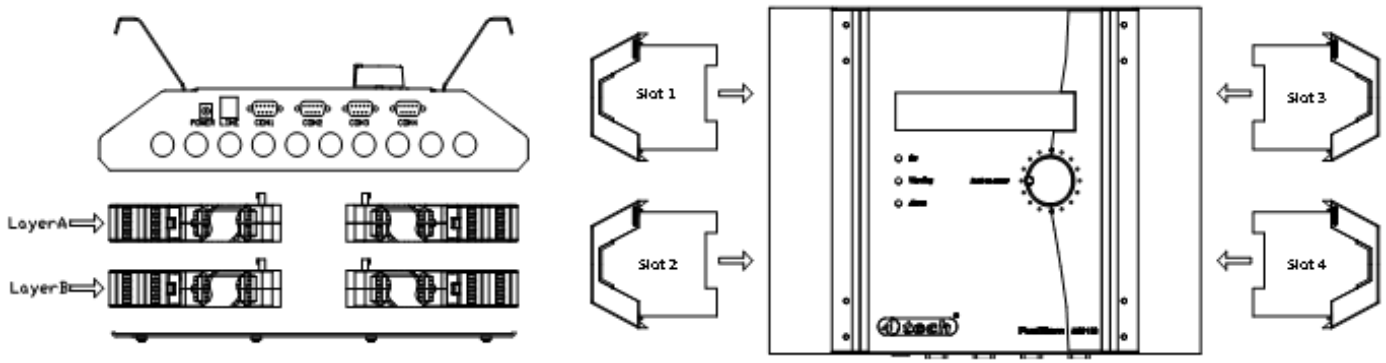


5.3 Adding a New Module to FuelCom®5080

The flexible, modular system architecture in FuelCom®5080 makes it easy to add new functionality for individual requirements. By adding a new module to a free slot inside the control unit, new functions are available. The standard FuelCom®5080 has 4 slots for modules, but it is possible to order 5080 with up to eight modules inside the control unit. If necessary, the full duplex RS485 local bus inside the FuelCom®5080 can be expanded to cover a number of maximum 32 modules on the bus line. In this case, the extra modules have to be installed externally. For further information please contact 4tech AS.

The following three standard modules are available, all ATEX approved:

- The **AD424** is an intrinsically safe galvanic isolated 4 channel 4…20mA input module, combined with an intrinsically safe power supply for power feeding to the probes. This module makes it easy to connect FuelCom®5080 with any current loop transmitter. If more than one AD424 module is added to the FuelCom®5080 control unit, each module has to be addressed using the DIP-switches.
- The **RE202** is an intrinsically safe galvanic insulated relay output module, which provides the user with four independent normally closed relay outputs. Each output is software controlled and can be programmed to trig on a specified event. If more than one relay module is added to the FuelCom®5080 control unit, each module has to be addressed using the DIP-switches.
- The **PT100** is an intrinsically safe galvanic isolated sensor input module, combined with an intrinsically safe power supply for power feeding. The module provides the user with two independent channels of interface to the sensors NVF and KVF. The data output from the module is presented on the RS485 local bus. With the PT100 protocol implemented on a host computer data can easily be polled through the local bus interface.



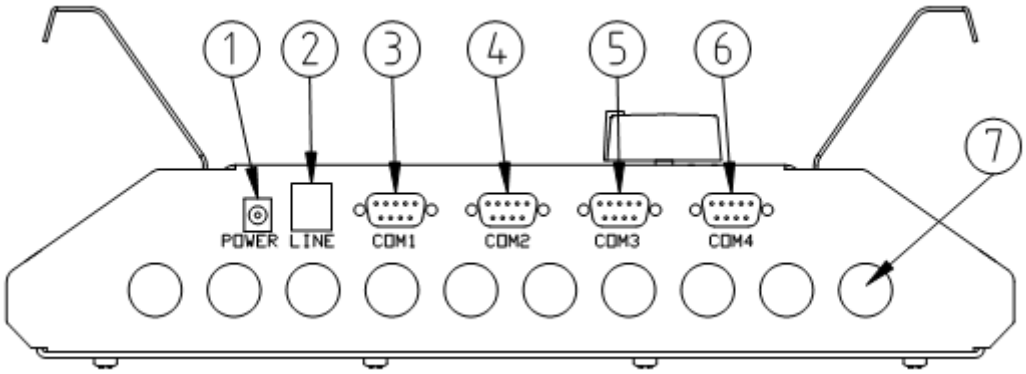
Recommended layout with only FuelBar®410/420 probes:

Slot 1: Tank 1 & 2	**Slot 3: Tank 5 & 6**
Slot 2: Tank 3 & 4	**Slot 4: Tank 7 & 8**

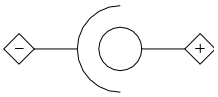
5.4 Module installation procedure

- Turn off the power to the FuelCom® controller.
- Open the access door on the control unit.
- Before inserting the module circuit board into the housing, the DIP switches must be set correctly. (see the user manual for the module)
- The module circuit board slides into a guide track inside the housing, and plugged into the module housing socket. Make sure the board enters the edge connector properly.
- Push the module into locked position.
- Connect the equipment to the terminals on the module in accordance with the wiring diagram (see the wiring section or the datasheet for the module).
- Whenever Ex modules are installed, observe the national safety rules and regulations for the prevention of accidents as well as the safety instructions listed in the datasheet of each module.
- Turn on the power and check the module for proper operation.

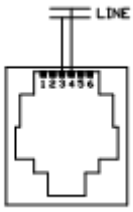
6 Wiring the Control unit



1. Power inlet connector.



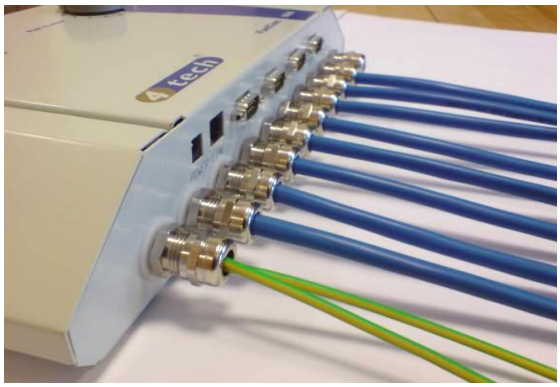
2. Line input for the built in analogue modem.



3. COM1. Communication port to the back office computer, where the FuelWin® software is installed.
4. COM2. Communication port for remote communication, like ISDN modem, GSM modem or other equipment.
5. COM3. Dedicated communication port for Point Of Sale interface (POS) Check the software manual for proper protocol.
6. COM4. Communication port for printer interface.
7. Cable inlets for sensor wiring (10 ea).

PIN No.	COM1	COM2	COM3	COM4
2	RxD	RxD	RxD	RxD
3	TxD	TxD	TxD	TxD
7	RTS	Not Supported	Not Supported	RTS
8	CTS	Not Supported	Not Supported	CTS

7 FuelCom® Grounding Bar (Ex zone).



In order to comply with Ex regulations, the **screen** on the blue cable which connects the FuelCom® modules with the probe (EX zone) must be connected to IS-ground at the FuelCom® side. The grounding Bar has 10 threads for M16 cable glands with connection facility for the cable screen, and it is prepared for a grounding cable to be connected at each side. The grounding cables from the Bar must be connected directly to separate IS-ground. It shall not be connected to ordinary protection ground.

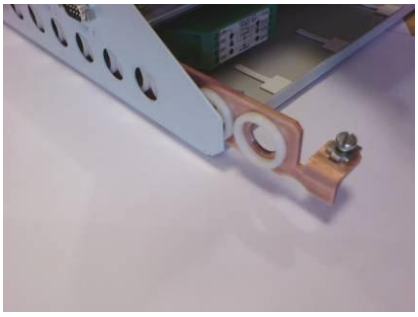
⚠ Important notice! In order to comply with Ex safety regulations, the screen of the blue installation cable shall **NOT** be connected to the cable screen of the probe inside the *Scotchcast* connection joint.

The grounding kit contains the following items:

- 1 pc. Copper grounding bar with threads for 10 pc. of M16 cable glands.
- 4-10 pcs. M16 Cable glands with internal contacts for coax screen (quantity depending on number of modules preinstalled).
- 1 pc. Label kit for tank numbering 1-8.
- Blinding plugs.

7.1 Assembly of Grounding bar inside FuelCom®

⚠ **Please follow the instructions carefully!**
Please remove all cables and rubber plugs. The copper bar is assembled by inserting it inside the FuelCom cabinet as shown. The screw terminal for the IS-grounding cable faces upwards. The copper bar is fixed with the cable glands only. Use one cable gland at the end first, then the remaining. Use the blind plugs to close the remaining openings. The cable gland is inserted using a M20 wrench.



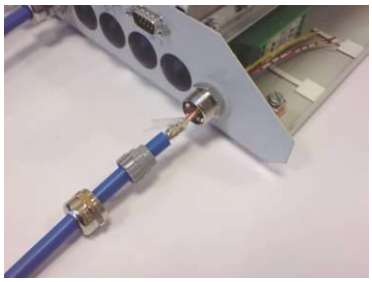
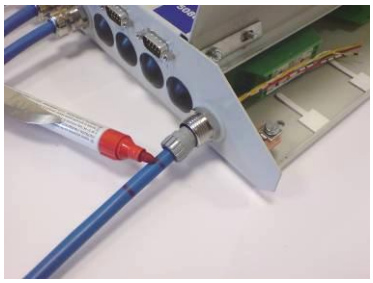
(In some markets, the insulation washers shown on the pictures are not in use).

7.2 Installation of the cables into the cable glands.

After the grounding bar is placed, the cable installation can begin. Please do not use the left most and right most bushing for the tank installation cables. These are reserved for the grounding cable (IS-ground). Inside each cable gland, there are four contact springs for connecting the cable screen. The cable insulation must therefore be removed on the section where the contact facility appears. Please follow the guidelines carefully.

- Insert the cable through the gland as far as necessary for connection to the proper module.
- Mark the cable at the end of the cable gland with an ink pen. (A).
- Retract the cable approx. 4 cm and mark the cable again (B) at the end of the gland.
- Make a new mark C in the middle between the two marks A and B.
- Remove the outer insulation on the cable between B and C in order to expose the screen.
- Install the cable again in the first position A.

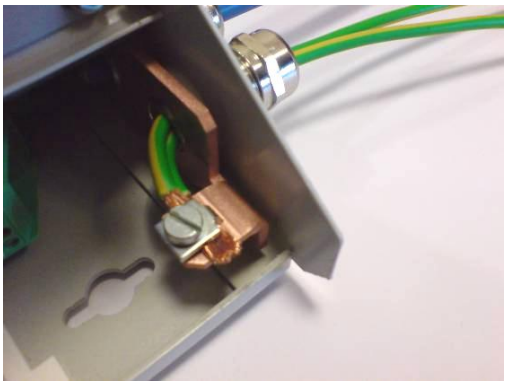
The screen of the coax cable is now grounded inside the cable gland. Tighten the screw on the gland to fix the cable.
The cable screen shall not be in contact with any other parts inside the cabinet. At the module end, the screen should be cut or insulated. If the screen is exposed, make sure it is insulated properly with tape.
The cables to other tanks are installed in a similar way. One cable through one cable gland only! The number of cable glands needed is the same as number of cables plus two for ground cables. Each tank cable is marked with its respective tank number using the label kit. (Tank number 1 - 8).

7.3 Connection to IS- ground.

The grounding cables to IS- ground is installed through the left most and right most cable gland directly to the grounding screw on the copper bar. Both connections should be used. The recommended dimension of the cable is 4-6 mm^2. The colour used is green / yellow also for IS- Ground.

The grounding shall be possible to verify by measuring the resistance in the two ground cables. This is done by opening the circuit at IS-ground an measure a loop resistance in the grounding R<1 ohm



8 Wiring of the control unit to external devices

This configuration table refers to the output COM3 on the FuelCom®5080.

Serial POS interface configuration table:			
	FuelCom® 5080	Marketer	Delta
Pin No.	2	6	2
Pin No.	3	13	3
Pin No.	5	8	7

Description of the most common RS-232/ V.24 signals.
Description of connection between FuelCom®5080 and PC (FuelWin) or PetroPoint.

FuelCom®5080 9-Pin D-Sub (Female)	**8.1.1 Connect**	**FuelWin 9-Pin D-Sub (Male)**
Pin 2	to	Pin 3
Pin 3	to	Pin 2
Pin 5	to	Pin 5

Description of connection between FuelCom®5080 and Modem (FuelWin/MCD/NKS).

FuelCom®5080 9-Pin D-Sub (Female)	**8.1.2 Connect**	**Modem 25-Pin D-Sub (Male)**
Pin 2	to	Pin 3
Pin 3	to	Pin 2
Pin 5	to	Pin 7
Pin 7	to	Pin 4
Pin 7	to	Pin 20

Description of connection between FuelCom®5080 and DELTA (DELTA-Statoil/DELTA-Jet).

FuelCom®5080 9-Pin D-Sub (Female)	**8.1.3 Connect**	**DELTA 9-Pin D-Sub (Male)**
Pin 2	to	Pin 2
Pin 3	to	Pin 3
Pin 5	to	Pin 7

Description of connection between FuelCom®5080 and MARKETER (YX-MARKETER).

FuelCom®5080 9-Pin D-Sub (Female)	**8.1.4 Connect**	**MARKETER 15-Pin D-Sub (Male)**
Pin 2	to	Pin 6
Pin 3	to	Pin 13
Pin 5	to	Pin 8

Description of connection between FuelCom®5080 and Printer

FuelCom®5080 9-Pin D-Sub (Female)	**8.1.5 Connect**	**MARKETER 9-Pin D-Sub (Male)**
Pin 2	to	Pin 2
Pin 3	to	Pin 3
Pin 5	to	Pin 5

9 Planning Sensor and Probe Installation

9.1 New sites

To calculate conduits and wiring lengths, use a planning diagram. Prior to site paving, the contractor must diagram all proposed conduits running between the FuelCom® 5080 Control unit's intended location, and its deployed sensors and probes. This document is kept together with other documents at the site.

⚠ During the site planning process of Ex installations, the applicable national safety standards and the general technical rules must be observed. The illustration in the next chapter shows a simplified site deployment of probes and sensors. The location of probes and sensors will vary from site to site.

9.2 Existing sites

If the FuelCom®5080 system is being retrofitted at a site with no cable conduits or manholes, three options are given:

1. Dig out trenches in the forecourt to run rigid conduit pipes out to sensors and probes.
2. Cut grooves in the pavement, run direct trenches to these devices, and then seal the cable groove.
3. A combination of the two methods above.

The same planning process and the same standards regarding safety of Ex-installations have to be carried out as for new sites.

9.3 Intrinsically safe wiring issue

⚠ The output power from the intrinsically safe galvanic isolated modules inside the FuelCom®5080 is limited to a safe level, and normally it is not possible to ignite fuel. But the capacitance and inductance in the installation cable may store energy that might ignite fuel. Therefore, the energy calculation diagram must be filled out in order to verify that the length of the cable is within the safety limits (example form in appendix VI). Do not exceed the specified data of the equipment installed in the hazardous area.

9.4 Grounding issue

Because there is a fully galvanic isolation between the Ex side and the safe side of the modules, no time demanding ground bus has to be installed, like in old systems with zener barriers. Only the screen of the installation cable must be connected to ground using the grounding bus bar (see section 7).

⚠ The grounded screen of the blue* installation cable must NOT be connected to the screen of the tank probe. In that case the safety of the installation is violated.

9.5 Wiring conduit safety issue

To maintain the intrinsically safe integrity of the FuelCom® 5080 system, sensor and probe conduits can share the same trenches as power conduits, but the intrinsically safe sensor and probe wiring can NOT share the same conduit with any other wiring. Where power conduits and conduits with intrinsically safe wiring meets in a junction manhole, the intrinsically safe wiring should be separated from the power cables with a safe distance. This to prevent induced current to be transformed. Such separation between cables is important when power cables and intrinsically safe cables share the same suspension bridge. Please follow applicable national safety standards regarding Ex installations.

9.6 Cable

The extension cable between probe and controller should fulfil the following requirements, such as (but not limited to):
Oil resistance according to DIN ISO, 6722 part 1 par. 4.11, DIN VDE, 0472 part 803 test mode B.
Petrol resistance according to DIN, ISO 6722 part 1 par 4.12.
PVC self-extinguishing and flame retardant according to DIN VDE, 0482 part 265-2-1/EN 50265-2-1/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B).
Special PVC core insulation to DIN VDE 207
Cores color coded according to DIN 47100
Color blue RAL 5015

*** ⚠ Note! According to ATEX / Ex regulations, the colour of intrinsic safe cables shall be blue.**

9.7 4tech installation cable

We recommend using the especially made 4tech cable.

Provided that 4tech cable type LIYCYöb KEA-030 is used, the values below apply for the specified length. If another cable is used, the calculations must be done manually.

Change cable parameters according to datasheet for the actual cable.

Length	200	300	400	500	600	700	800	900	1000
Resistance. Rc	15,12	22,68	30,24	37,8	45,36	52,92	60,48	68,04	75,6
Capacitance. Ccab	24	36	48	60	72	84	96	108	120
Inductance. Lcab	0,14	0,21	0,28	0,35	0,42	0,49	0,56	0,63	0,7

The theoretical limit of installed cable length for gas group IIA (gases of hydrocarbons) is much longer than indicated above.

For practical installations, the table is limited to 1000 metres.

The actual length meters should be used in every calculation and documentation.

For control, measure the feeding voltage from the output of the AD424 module for each channel.

Fill in all data in the verification form (appendix VI), and sign.

9.8 Sealing the conduits

All cable conduits must be sealed with flame-retardant filler after the cable work is done.

10 Probe and sensor introduction

10.1 FuelBar®410/420 and P44 probe

The FuelBar®410/420 and P44 are high performance analogue pressure transmitters for level measurement in storage tanks, above or underground. Together with FuelCom®5080, this forms a unique inventory system for service stations. The FuelBar® and P44 probe is based on a hydrostatic measuring principle. The pressure at the bottom of the tank caused by the column of liquid height is proportional to the analogue output signal. These probes also provide continous temperature indication in a separate signal loop. The FuelBar®410/420 is equipped with an on/off water detection float which triggers at 35 mm. water level. The pressure transducer is delivered for gauge pressure ranges from 0... 160 mbar to 0... 1 bar. Other measuring ranges are available on request.
This measuring principle has a wide measuring range which spans from 0 to 20 metres. The FuelBar®410/420 is proved to be accurate and will function effective as an early warning system for leaks. The probe will continuously update your site management system with highly accurate inventory information concerning product level, temperature and water indication. Full ATEX approval for sone 0.

Ex Marking: **II1G EExia IIC T4**
ATEX: **NEMKO 99 ATEX 219**

10.2 MiniBar

The customer specific, submersible pressure transducers MT-30 are available for gauge pressure ranges from 0... 100 mbar to 0... 20 bar. Other measuring ranges are available on request.
The most common applications are in the areas of medical devices and for hydrostatic level measurement. Due to the small build (Ø22mm) the transducers could be used in a large variety of applications. 4tech has the know-how to provide solutions for the most diverse applications, adapting both the electrical and the structural aspects of the pressure transducer to your specific application. Full ATEX approval for sone 0.
Typical users are heating oil, lubricant and diesel customers.

Ex Marking: **II 1/2 GD EEx ia IIC T6**
ATEX: **ISSeP07ATEX003X**

10.3 FuelBar®probes, range of variation:

The FuelBar®410/420 can be delivered in many variants and different pressure ranges:

A) With AirTrap® and aluminium pipes:

Typically:
Diesel and petrol
No ethanol additives
Max tank height, 320 cm
Without overfill prevention
With water detect float

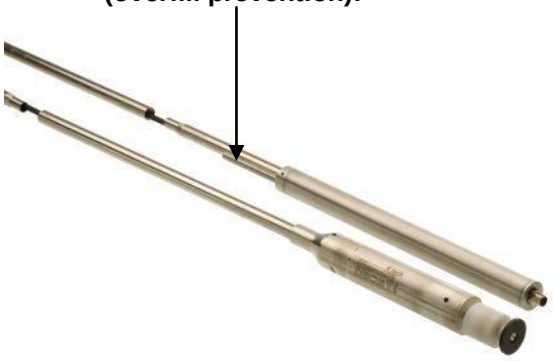
B) With AirTrap®, aluminium pipes and PTC (overfill prevention):

Typically:
Diesel and petrol
No ethanol additives
Max tank height, 320 cm
With overfill prevention
With water detect float

C) With AirTrap® and SS316L pipes:

Typically:
Diesel, petrol, E85
Ethanol additives, OK
Max tank height, 320 cm
Without overfill prevention
With water detect float

D) With AirTrap®, SS316L pipes and PTC (overfill prevention):



Typically:
Diesel, petrol, E85
Ethanol additives, OK
Max tank height, 320 cm
With overfill prevention
With water detect float

E) Without pipes, but with anchor:
Can also be delivered with Airtrap®

Typically:
Diesel, petrol, E85
Ethanol additives, OK
Max tank height, 2.500 cm
Without overfill prevention
With water detect float

F) Without pipes and float, but with anchor:
Can also be delivered with Airtrap®

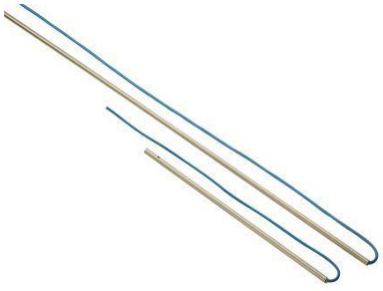
Typically:
ADBlue, water, other liquids
Ethanol additives, OK
Max tank height, 2.500 cm
Without overfill prevention
Without water detect float.

10.4 Differences in FuelBar®410/420 probes:

The FuelBar®410 and 420 probes are identical, except the temperature loop calibration range.
The range for FuelBar®410 is -50 - + 50 ºC, and the new FuelBar®420 range is -20 - + 80 ºC

This must be observed when replacing an older FuelBar 410 with the new 420.
In this case it is necessary to adjust the temperature readout via the FuelWin software.

10.5 Separate overfill prevention sensor:



The overfill prevention system is also available as a retrofitable solution. The overfill sensor can be mounted directly through the flange, using a proper nipple. The length of the sensor can be adjusted on site, in order to define the exact overfill limit.

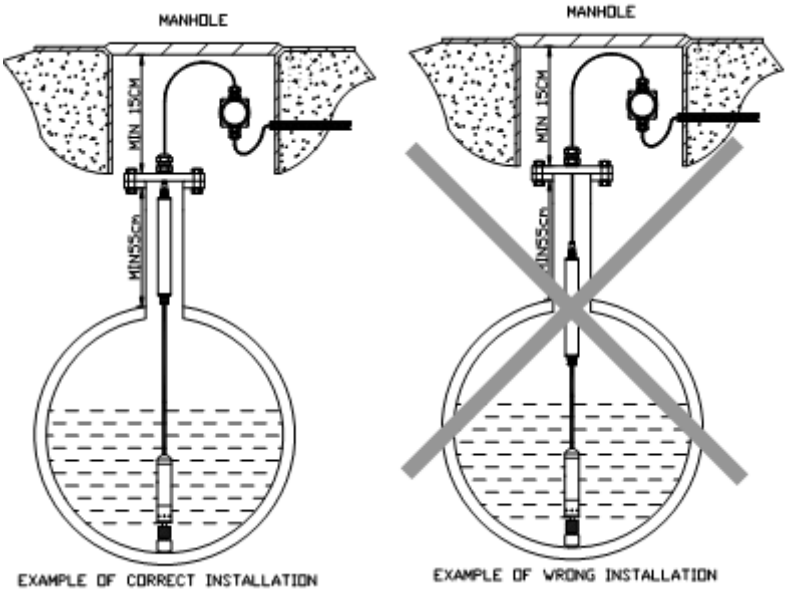
The Overfill Prevention Control System (OPC) is delivered as a separate solution. It provides a secure means of protecting the environment. Tanker trucks will effectively be stopped in overfilling underground or above ground tanks. The system is a self-checking

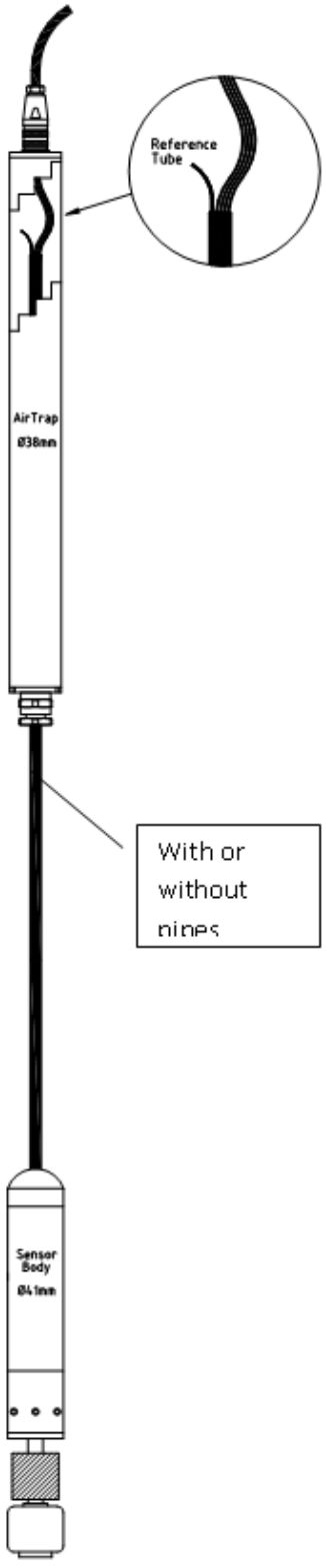
security device that prevents overfilling of up to 8 tanks simultaneously, which means that on most petrol stations, all tanks can be filled at the same time. The in-truck OPC System (option) is also able to provide the truck driver with information of the ullage of each tank via the tank level gauge system and the truck driver does not need to gauge each tank manually. These features not only give a very secure system but also optimize the unloading process of the tank trucks, with several minutes saved at each petrol station.

11 The AirTrap® Functionality.

The AirTrap® is a registered and patented product of 4tech AS.

In order to obtain a very accurate measurement, it is a benefit to have the air reference tube of the FuelBar 410/420 probe placed inside the tank. But if the air tube is filled with any liquid, it will cause permanent damage to the probe and make it report wrong liquid level height.
Using the AirTrap®, it is possible to have the reference tube located inside the tank without having the risk of filling the tube with liquid. With the AirTrap® installed properly it is not possible for any liquid to reach the reference tube of the probe. As soon the AirTrap® is emerged vertically into any liquid, an air pocket is being held inside the top of the AirTrap® pipe, and will prevent any liquid from reaching the reference tube. During the installation, make sure the AirTrap® is properly installed, and that the lower end of the AirTrap® is not installed below the lower end of the riser pipe. Before the probe is lowered into the tank, secure the cable with a strain relief device. Otherwise, you might drop the probe into the tank.
Note: The AirTrap® can only be exposed to the liquid in a vertical position.





12 Oil separator and overflow sensor.

12.1 Description of the KVF oil separator

An oil separator is a container where oil products like petrol, diesel oil, motor oil, and waste oil are separated from water. The purpose of this separation is both to clean the water of oil products, and to avoid polluting the environment or the purifying plant. Another purpose is to collect the oil products so that they can be destroyed in an environmentally safe way.

12.1.1 The KVF Sensor

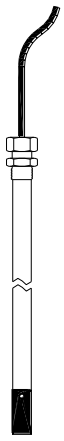
Theoretically, the KVF sensor requires no maintenance, as it contains no moving parts. But since an oil separator contains all kind of oils and fats, there may be a risk that the sensor, eventually, may be covered with a layer of some indeterminable substance. This may enhance the risk of false alarms. Accordingly, the sensor should be cleaned when the separator is emptied. The sensor itself should not need to be tested, but this may be a good precaution. Please see the user manual for the KVF sensor.

12.1.2 The KVF Sensor and Emulsion

There may be cases where the oil is not separated because an emulsion has been formed. There are two kinds of emulsion, mechanical emulsion and chemical emulsion. For additional information, or if there is any chance that the oil is has not been separated from the water when the liquid enters the sewage system, please contact the supplier of the separator. The KVF sensor is not capable distinguishing between oil and water in an emulated state, and it is the user who is responsible, no matter which type of liquid or separator is used, that no polluted liquid enters the sewage system, which may harm the environment.

12.2 The NVF (PTC thermistor) Sensor installed as an Overflow Alarm.

To get a high level alarm before overflow of the oil separator, the NVF sensor should be installed. The NVF sensor works according to the thermal principle where a PTC resistor is placed inside a tube, is heated. When the sensor is submerged in liquid, the PTC resistor is cooled, which results in an alarm signal to the central unit.



12.2.1 Inspection of the NVF sensor.

The NVF sensor is robust, and all oil products become low viscosity when hated. This reduces the risk that substances stick to the sensor. When the container is emptied it is always a good idea to inspect the system and check the sensor. If the sensor is lowered to a height which corresponds to the hole in the side of it, the alarm will go off, and this means that the sensor is OK.

13 Modules of FuelCom®5080

13.1 General safety advice

Please study these safety advices carefully.

13.1.1 Shielding the Data Cables

The data cables are shielded using a Grounding Bar with special ground Glands. Use shielded twisted pair cables. Connect the cable shield to ground on one side (FuelCom side) only.

13.1.2 Technical Data

The modules are only to be used as associated with an intrinsically safe apparatus. All the instructions and conditions in the approval for the application area of the module have to be respected. Se separate user manual for each module.

13.1.3 Conformity with Standards

These intrinsically safe modules have galvanic insulation, and meet the requirements of EN50014 and EN50020. This product has been designed, manufactured and tested in accordance with the ATEX regulations. The intrinsically safe outputs from these products are suitable for zone 0, 1 and 2.

13.1.4 Installation/Start up

When installing and operating electrical apparatus, the applicable national safety standards and the general technical rules for maintenance and inspections must be observed. Transportation and storage in original package only!
Prior to starting up, the following checks should be performed and compared with the technical data:

- Are the proper operating conditions being respected?
- Check the correct polarity of all connections.
- Check that there are no impermissible voltage feeding back into the output circuit during start up
- Measure the total input/output load and compare with the maximum permissible load in the data sheet.
- Make sure that the cable screen is grounded only at the FuelCom® side.
- Check the power supply for correct values.

13.1.5 Connection Type

Intrinsically safe (I.S.) circuits and non-I.S. circuits have to be installed separately.
“Combicon” Screw-clamp terminals:
Permissible cable cross sections: 0.2mm² to 2.5mm² (24 AGW to 14 AGW).
Recommended cable cross section: 0.4mm²- 0.5mm² (21 AWG to 20 AWG)

13.1.6 Service Information

In case of unusual behaviour of the device, please check cables and all external connections.
Overloading of the device must be avoided.
Repairs of the explosion protection are only to be carried out by 4tech AS or a qualified electrician in compliance with the applicable national standards.
For replacements of spare parts, only original 4tech AS replacements parts are to be used.
Defect units or modules must be returned to 4tech AS for repair, no other repair shops are allowed to repair Ex products made by 4tech AS.

13.1.7 Disposal/Recycling

Observe the national regulations for disposal and recycling. The material of the housing is Polyamide (PA)

Observe the national safety rules and regulations for the prevention of accidents as well as the safety instructions given:

13.2 The AD424 Intrinsically Safe - Galvanic Isolated 4...20mA Input Module

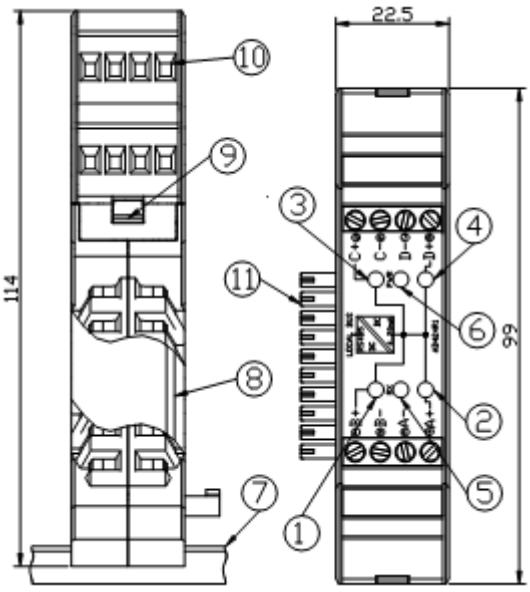
13.2.1 Safety instructions

- The input module is designed for Ex applications in zones 0, 1 or 2, but the module itself is not suitable for mounting in an explosive atmosphere, it must be installed in a safe area.
- The temperature class and explosion group as well as the special conditions marked on the product have to be respected!
- According to the EC-type examination, the following limits of Ex-Protection must not be exceeded: AD424: Uo=24,74 Io=90mA Po=0.65W
- Modification of the device or changes of its design are not permitted!
- The installation is only permitted in housings with minimum IP20 protection or in closely supervised systems.
- The device has to be used for its intended purpose and in an undamaged and proper condition.
- For replacement, only 4tech original replacement parts must be used.
- Components which need repair must be shipped to 4tech AS. Unauthorized repair is forbidden.
- Service that will influence on the explosion protection is only to be carried out by 4tech or a qualified Ex electrician in compliance with the applicable national standards.
- Prior to its first start-up the device has to be checked in accordance with the instructions as listed in the section “installation”.
- Observe the national safety rules and regulations for the prevention of accidents as well as the safety instructions given.

13.2.2 Brief Description

The AD424 is an intrinsically safe galvanic isolated 4…20mA input module, which provides the user with four independent channels of transmitter power and 4…20mA inputs. The data output from the module is presented on the RS485 local bus. If more than one module of AD424 is added to the bus system, each module has to be addressed using the DIP-switch on each module. (See the AD424 installation and user manual). Each channel is labelled with letter from A to D. When a loop powered device is connected to one of the channels, a red led is set to indicate that the polarity of the connection is right. A flash on the green (RX) LED is indicating a successful transmission from a host computer. A green LED (PWR) indicates that power is applied to the module.

1. LED Red channel B
2. LED Red channel A
3. LED Red channel C
4. LED Red channel D
5. LED Green RX transmission received from host
6. LED Green power indicates that power is applied
7. Snap in foot for mounting on 35mm din rails. (EN 50022)
8. Printed circuit board inside housing
9. Button on each side to release the top of the housing. Pull to get the PCB out of the housing
10. IS Screw terminal on each side
11. Local Bus connector, 10pole.



13.3 The RE202R2 Intrinsically Safe - Galvanic Isolated Relay Output Module

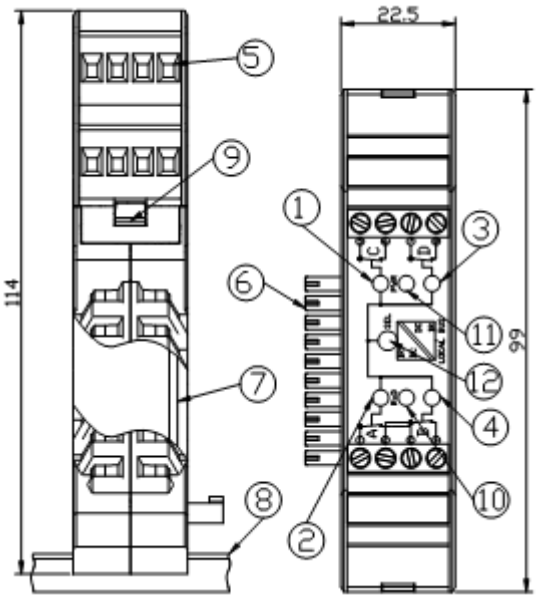
13.3.1 Safety instructions

- The module is designed for Ex applications in zones 0, 1 or 2, but the module itself is not suitable for mounting in an explosive atmosphere, it must be installed in a safe area.
- The temperature class and explosion group as well as the special conditions marked on the product must be respected!
- According to the EC-type examination, the following limits of Ex-Protection must not be exceeded: RE202R2: Ui/Uo<60V, Ii/Io<500mA.
- Modification on the device or changes of its design is not permitted.
- The installation is only permitted in housings with minimum IP20 protection or in closely supervised systems.
- The device has to be used for its intended purpose and in an undamaged and proper condition.
- For replacement, only 4tech original replacement parts must be used.
- Components which need repair must be shipped to 4tech AS. Unauthorized repair is forbidden.
- Service that will influence on the explosion protection is only to be carried out by 4tech or a qualified Ex electrician in compliance with the applicable national standards.
- Prior to its first start up, the device must be checked in accordance with the instructions as listed in the section “installation”.

13.3.2 Brief description

The RE202R2 is an intrinsically safe galvanic insulated relay output module, which provides the user with four independent normally closed relay outputs. Each output is software controlled and can be programmed to trig on a specific event. The output is set by sending a command through the local bus from a host computer. Whenever an output is activated a red LED is also set to indicate the activated output. A flash on the TxD LED is indicating a successful transmission from a host computer. It is possible to set the RE202R2 relay module into manual operation by pressing the “SEL” button (Se table in the RE202R2 module user manual). This option is time controlled and the module will resume normal operation after 2 min. A green LED indicates that power is applied to the module.

1. LED Red relay C
2. LED Red relay A
3. LED Red relay D
4. LED Red relay B
5. IS Screw terminal on each side
6. Local Bus (Pin #2)
7. Printed circuit board inside housing
8. Snap in foot for mounting on 35mm din rails. (EN 50 022)
9. Button on each side to release the top of the housing. Pull the PCB out of the housing.
10. LED Green RxD indicates communication.
11. LED Green PWR indicates applied power.
12. SEL button for manual operation



13.4 The PT100R1 Oil Separator interface module

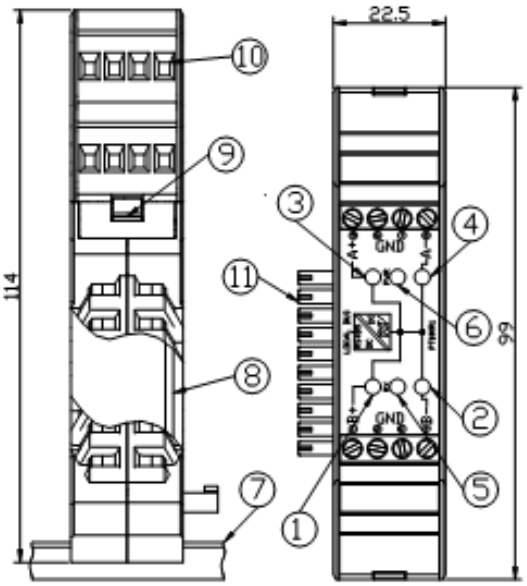
13.4.1 Safety instructions

- The input module is designed for Ex applications in zones 0, 1 or 2, but the module itself is not suitable for mounting in an explosive atmosphere, it must be installed in a safe area.
- The temperature class and explosion group as well as the special conditions marked on the product have to be respected!
- According to the EC-type examination, the following limits of Ex-Protection must not be exceeded: PT100R1: Uo=23.64 Io=366mA Po=2.16W
- Modification of the device or changes of its design are not permitted.
- The installation is only permitted in housings with minimum IP20 protection or in closely supervised systems.
- The device has to be used for its intended purpose and in an undamaged and proper condition.
- For replacement, only 4tech original replacement parts must be used.
- Components which need repair must be shipped to 4tech AS. Unauthorized repair is forbidden.
- Service that influences on the explosion protection is only to be carried out by 4tech or a qualified electrician in compliance with the applicable national standards.
- Prior to its first start-up the device has to be checked in accordance with the instructions as listed in the section “installation”.
- Observe the national safety rules and regulations for the prevention of accidents as well as the safety instructions given.

13.4.2 Brief Description

The PT100R1 is an intrinsically safe galvanic isolated sensor input module, which provides the user with two independent channels of interface to the sensors KVF and NVF. The data output from the module is presented on the RS485 local bus. With the PT100R1 protocol implemented on a host computer data can easily be polled through the local bus interface. If more than one module of PT100R1 is added to the bus system, each module has to be addressed. (See user manual of the PT100 module). The two channels are labelled with letters A and B. The KVF sensor must be connected to channel A, and the NVF sensor must be connected to channel B. When a sensor is connected to one of the channels, a yellow led is set to indicate that the sensor is enabled and the polarity of the sensor connection is made correct. The NVF sensor /thermistor need a 20…60 sec. of warm up period before it is enabled. During the warm up period the red led on channel A starts to blink. If an alarm condition occurs, on one of the sensors, a red led is set to a steady state. A flash on the green (RX) LED is indicating a successful transmission from a host computer. A green LED (PWR) indicates that power is applied to the module.

1. LED Red/Yellow channel B+
2. LED Red channel B-
3. LED Red/Yellow channel A+
4. LED Red channel A -
5. LED Green RX transmission received from host
6. LED Green power indicates that power is applied
7. Snap in foot for mounting on 35mm din rails. (DIN EN 50 022)
8. Printed circuit board inside housing
9. Button on each side to release the top of the housing. Pull to get the PCB out of the housing
10. IS Screw terminal on each side
11. Local Bus 10pol.



14 Wiring Probes and Sensors to the Control unit

14.1 Site wiring preparation.

This section assumes that all preliminary site preparation is completed and that field wiring from the control unit to the probes and sensors junction boxes are in place.

14.2 General safety issue

⚠ Wiring of intrinsically safe equipment in hazardous areas must be carried out in accordance with the applicable national standards and the locale regulations.

14.3 Installation of hardware

14.3.1 Sensor and probe cable

The cable used for field wiring of FuelBar® probes must contain at least 4 conductors of minimum 0.4mm^2 in two twisted pairs. Use one twisted pair to each signal loop. The cable must be shielded and the colour of the outer jacket shall be blue. We recommend the 4tech special Ex cable with reinforced insulation against oil and petrol.

14.3.2 Communication cable

The RS232 communication cable for interfacing between control unit and POS-control unit and back office computer and other equipment connected to the control unit must contain 4 conductors of minimum 0.34mm^2. The cable must be shielded and the shield has to be connected to ground/ chassis at both ends.

14.3.3 D-sub connectors to control unit

A 9-pin female D-sub is required to interface the communication ports of the control unit.

14.3.4 Field junction box ABTECH BPGC2 (Ex e)

This junction box is designed for use in hazardous areas and for general electrical installations. The junction box has 2 cable entries, and it is manufactured in shock proof, UV resistant, fibreglass reinforced polyester. High temperature resistance and very high anti static capabilities. Approved cable outer diameter 3 – 8 mm as standard (cable glands for other diameters can be ordered separately). Dust and water tightness according to IP67 classification. Gore-Tex® filter installed.

14.3.5 Installing probe without Airtrap

If the probe used does not have an Airtrap, the air tube must be terminated inside a Field Junction box which has a Gore-Tex® filter installed. During installation, mechanical stress and sharp cable bends must be avoided in order to keep the air tube intact. The air tube must be protected from any moisture during installation. If a drop of fluid enters the small tube, the probe is damaged beyond repair. Connect the probe wires using scotchlok. Verify the function, and close the top cover on the box.

⚠ The cable screen from the probe **SHALL NOT** be connected to the screen of the blue installation cable, or any other ground terminal originating from the instrument panel. The screen in the installation cable shall be connected to ground for EMC shielding, but ground must **NEVER** be connected to the instrument inside the tank (Ex zone 0). This is an important safety rule which never must be violated.

14.4 Additional Equipment

14.4.1 Installing an external ISDN modem for connection to a remote server

If the internal analogue modem can't be used, an external ISDN or/TCP-IP modem can be connected externally to either COM1 or COM2 of the control unit. A cable from COM 1 or COM 2 on the control unit is connected to the serial port on the modem. Refer to the pin-out diagram below for cable attachment. Before the ISDN modem is able to receive or transmit data on the serial port, a set-up procedure must be performed. Connect the modem to one of the serial ports of a PC or laptop and start HyperTerminal in Windows. Select the COM port in HyperTerminal that corresponds with the physical COM port connected to the modem. In HyperTerminal type the following "AT" strings to initialise the modem:

AT&Z0=<Telephone number to the server> then press enter (The modem should answer <OK>)
Then type: AT&B0%D9S0=1%R5E0Q1&W then press enter The procedure is now completed.

Cable Connection Diagram

FuelCom®5080 9-pin D-sub (female)	Connect	**Modem 25-pin D-sub (male)**
Pin 2	To	Pin 3
Pin 3	To	Pin 2
Pin 5	To	Pin 7
Pin 7	To	Pin 4
Pin 7	To	Pin 20

14.4.2 Connecting a printer

The DPU-414 thermal printer or similar can be used with the FuelCom®5080 control unit.
The printer must be connected to the control units COM 1 port. Refer to the pin out diagram below for cable attachment. Before the printer is able to receive data through the serial port, three different software controlled DIP-switches must be configured as follows:

DIP-switch 1
1. (OFF) : Input = serial
2. (ON) : Printing Speed = High
3. (ON) : Autoloading = ON
4. (OFF) : Auto LF = OFF
5. (ON) : Setting Command = Enable
6. (OFF) : Printing
7. (ON) : Density
8. (ON) : = 100%

DIP-switch 2
1. (OFF) : Printing Columns = 80
2. (ON) : User Font Back-up = ON
3. (ON) : Character Select = Normal
4. (ON) : Zero = Normal
5. (ON) : International
6. (ON) : Character
7. (ON) : Set
8. (ON) : = Japan

DIP-switch 3
1. (ON) : Data Length = 8 bits
2. (ON) : Parity Settings 0 = No
3. (ON) : Parity Condition = odd
4. (ON) : Busy Control = H/W Busy
5. (OFF) : Baud
6. (ON) : Rate
7. (ON) : Select
8. (ON) :=9600 bps

Cable connection diagram

Equipment:	COM 1 on FuelCom®5080	Serial port on the DPU-414 printer
Connector type:	D-Sub 9pin female	D-sub 9pin male
Pin No.	2	2
Pin No.	3	3
Pin No.	5	5
Shield/ screen.	Connect to D-sub housing	Connect to D-sub housing

Order Code

DPU-414 thermal Printer	000-10414-00
AC-adapter PW-4007-E1	000-14007-00
Battery pack	000-14005-00
Printer paper thermal	000-10414-10
D-sub 9pin male complete	010-09284-00
D-sub 9pin female complete	010-05502-00
Shielded data cable LIYCY .34mm^2	250-04599-00

15 Setting up FuelCom®5080

15.1 Configuration and calibration using FuelWin®

The best way to set up, configure and calibrate the system is by using the FuelWin® application, running on Microsoft Windows. Please refer to the following documents for more details:

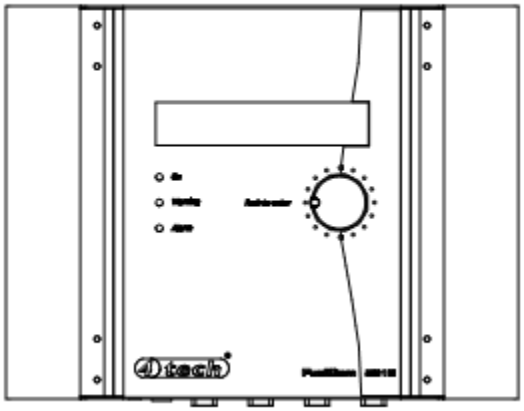
- FuelCom® – Installation Guide (Doc No. 15-CFC08044)
  Provides a total overview of the installation and calibration process.
- FuelWin® – Users Manual (Doc. No. 15-SFW08043).
  Gives details of installation of FuelWin® and description of functionality.

15.2 Using FuelCom®5080 Front Panel

We strongly recommend using the FuelWin® when setting up the FuelCom®, but some operations may also be done directly on the Fuelcom® controller.

15.2.1 Operation

The push and scroll button on the front panel is used to navigate through the different FuelCom® 5080 menus, selecting options, entering digits and selecting different parameters.



- Turning the wheel LEFT steps back one or more menu options.
- Turning the wheel RIGHT selects the next menu option.
- Pushing the wheel selects the shown menu.

15.2.2 Normal Mode

In normal mode Pushing the wheel displays the next tank on the front panel LCD. It is also used for silencing the buzzer if an alarm has been activated.
In Normal Mode the Liquid Crystal Display shows the following information:
where line # 1 shows the following information:

- T01 = current tank number.
- 95UL = current product type.
- VO = current volume in litres.
- PH = current Product Height in millimetres.
- WH = current Water Height in millimetres.

```
T01 95UL VO: 15613L PH: 1715mm WH:0mm
             00.09.17 21:55

[    PUSH WHEEL TO SELECT NEXT TANK  ]
```

and line # 2 toggles between tank temperature, time and date and any active alarm.

15.2.3 Menu Mode

If the wheel is turned RIGHT the different user menus are displayed, turning the wheel LEFT will display the previous menu option and PUSHING the wheel selects the menu option.

15.2.4 If a digit shall be entered

- Turning the wheel LEFT decrements the digit.
- Turning the wheel RIGHT increments the digit.
- Pushing the wheel selects the digit.

```
T01 95UL VO: 15613L PH: 1715mm WH:0mm
             00.09.17 21:55
[RESET MENU ] [ LEFT ][ RIGHT][ PUSH ]
[           ] [ BACK ][ NEXT ][SELECT]
```

15.3 Description of System Alarms

A system alarm may be present on each tank, having its specific cause displayed on the FuelCom® console.
The following system alarms exist:

- System Alarm 1 – Error in strap table. One or more elements are smaller than previous element.
- System Alarm 8 – No communication with probe module (AD424).

15.4 Front panel <SERVICE MENU> reference

This chapter describes the SERVICE MENU option from the FuelCom®5080 front panel.

```
T01 95UL VO: 15613L PH: 1715mm WH:0mm
             00.09.17 21:55
[SERVICE MENU] [ LEFT ][ RIGHT][ PUSH ]
[           ] [ BACK ][ NEXT ][SELECT]
```

15.4.1 Some tank setup parameters

In earlier versions some tank parameters had to be set using the front panel. These were available through a given "secret password" (available upon request for installers). However, this should no longer be necessary as the entire configuration is carried out through FuelWin® software.
This procedure describes how to change the tank setup within the service menu:

- Select SERVICE MENU
- Enter correct PASSWORD
- Select tank number

Further description of the tank setup menu has been removed, since FuelWin is required to perform a secure configuration.

15.4.2 Special passwords

Some special passwords are made for the service menu, for performing certain actions. These should be performed with caution, as some combinations will erase the entire configuration. Please also note that this list is subject to change with no obligations to the table below.
The most used passwords are highlighted.

Password	Description of action
0	Disable all debug printouts
10	**Print pump/hose/tank links on COM1**
11	**Debug: Print pump transactions when they are received from the POS system**
12	Debug: Show leak test printouts
13	Debug: Show period report printouts
14	Debug: Show tank manifold printouts
15	Debug: Show tank calibration printouts
16	Debug: Show delivery logic TEXT printouts
17	Debug: Show delivery logic VOLUME printouts
18	Debug: Show delivery logic HEIGHT printouts
20	Disable stack load and com port debug to display
21	Enable stack load debug to display
23	Enable com load debug on display
24	Clear input buffer overflow flag on each port
50	Resetting stored modem settings (phone number, customer number, init strings, answer phone, login interval, alarm login) and resets the internal modem itself.
52	Initialise high and low warning levels to 90% and 10% for all tanks.
60	COM1: Toggle water height measurement unit in protocol (1/10 mm or 1mm)
61	COM2: Toggle water height measurement unit in protocol (1/10 mm or 1mm)
Secret	Tank setup menu
Secret	Format data flash

16 Appendix I - VII

16.1 Appendix I: Density table.

It is important to know the average density of the measured liquid. The measuring principle of the FuelBar®410 probe is dependent on the liquid density in order to measure the exact liquid level. If not set right, the system will report incorrect liquid height.

Density table

PRODUCT	LIQUID DENSITY FACTORS	VARIANCES
92 Unleaded	0.720	0.700 – 0.755
93 Unleaded	0.725	0.700 – 0.755
94 Unleaded	0.730	0.710 – 0.760
95 Unleaded	0.750	0.720 – 0.775
96 Unleaded	0.737	0.720 – 0.775
97 Unleaded	0.738	0.720 – 0.775
98 Unleaded	0.740	0.720 – 0.775
E85	0.78	
97	0.738	0.730 – 0.750
98	0.740	0.730 – 0.750
Diesel	0.825	0.810 – 0.840
Winter Diesel	0,810	0.800 – 0.840
Paraffin	0.800	0.780 – 0.815
Water	0.960 +/-0.0075	0.950 – 0.970
Interfuel	0.960	
BioDiesel	0.885	
AdBlue	1.090	
Ethanol	0.79	
V-Power	0.735 +/-0.0075	

This numbers are called density factors because they don't describe the product density as such, but rather the density multiplied with 0.981 (gravity force). Please be aware the density variations between different countries (these density factors are used for Oslo, Norway).

NOTE!

If the gravity force is different in the area where the FuelCom® 5080 is installed the density factor must be adjusted to the following formula:

Density=d, Liquid density factor=ldf, Local gravity factor=lgf

Ldf = (d / 9,81) * lgf

Gravity table:

Lattitude:	0	5	10	15	20	25	30	35	40
Lgf:	9,780	9,781	9,782	9,784	9,786	9,790	9,793	9,797	9,802

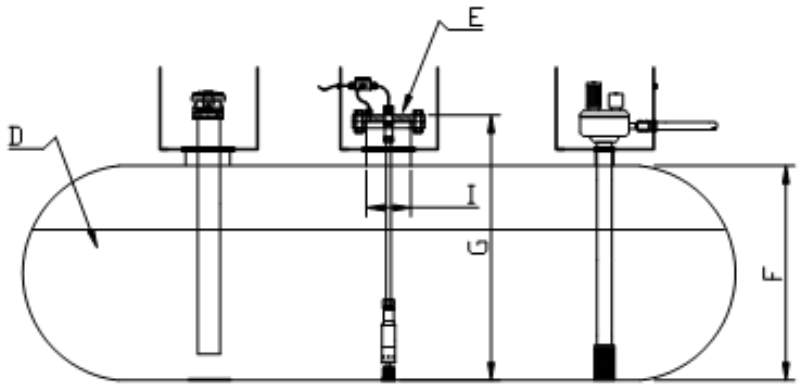
Lattitude:	45	50	55	60	65	70	75	80	85
Lgf:	9,806	9,811	9,815	9,820	9,823	9,826	9,829	9,831	9,832

16.2 Appendix II: Installation plan.

Customer:		Entrepreneur:	
Company name:		Contractor:	
Company address:		Company address:	
Postal code:	City:	Postal code:	City:
State:	Country:	State:	Country:
Telephone:	Fax:	Telephone:	Fax:
Contact name:		Contact name:	

Is the site prepared for installation of automatic tank gauge system? Please fill out the following information and return it to 4tech AS:			
Conduits from each tank to the future location of the FuelCom® 5080 control unit: (required)		Yes: ☐	No: ☐
Strapping table for each tank: (required)		Yes: ☐	No: ☐
Site map: (option)		Yes: ☐	No: ☐
Back office computer for installation of FuelWin®: (option)		Yes: ☐	No: ☐
One free RS232 communication port on the back office computer: (option)		Yes: ☐	No: ☐
FuelWin® requires Windows on your back office computer (option)	windows:☐		Other: ☐

Manifolded tanks	Tank no.	Total tank volume	Type of liquid/petroleum	Type of flange/dimension	Tank diameter	Approximately probe height	Dimension of Riser Pipe
A	B	C	D	E	F	G	I
☐	1						
☐	2						
☐	3						
☐	4						
☐	5						
☐	6						
☐	7						
☐	8						



16.4 Appendix III: Technical specifications for FuelCom® 5080.

Product	**FuelCom® 5080 Fuel tank gauge control unit.**
External Communication standard:	Analogue telephony (TBR21), options: GSM /SMS, TCP/IP
Power supply (standard): **DC input voltage (optional)**	AC Adapter: Input: 100-230VAC, output 12VDC. / 1,5A. 6V <VDC<14 V. Maximum input voltage 14,5VDC P=18W
CE	EN 61000-6-1 / 2 / 3-A1/ 6-4 EN 55022. LVD2006/95/EC
ATEX Applications	Yes, with AD424 and approved sensors/probes
Dimensions (W x H x D): **Environment:** **System setup:**	Housing: 35,1 x 27,0 x 7,0 cm 0 to 45 °C Indoor, outdoor inside approved cabinet with heating FuelWin software
Internal Communication standard:	RS485 bus, max 60 nodes supported
Interface modules **RS485 I/O modules (optional):**	AD424, intrinsically safe 4-20mA input module (Ex) PT100R1 , intrinsically safe Oil separator interface module (Ex)
Gauge methods (Standard):	External sensor 4-20mA current loop. Hydrostatic pressure
Firmware upgrade: **Installation grounding:**	Boot loader Separate IS grounding facility (optional)
Accuracy (with 4tech probes): **Max number of tanks:**	+/- 0,1 – 0,2 % (of accumulated sales) 8
Alarm outputs:	Audible alarm, Visual alarm, alarm via web application
Memory backup:	Option: 8 Mbyte Flash memory. (SD-socket)
Max tank volume:	650 m^3 with large tank flag activated
Display: **Keyboard:**	40 char. *4 lines alphanumeric backlit display Option: Truck driver display (pos) via separate connector Option. 80-Columns thermal printer for reports and alarms Single scroll/ push control button
Battery backup:	Real time clock only. No internal batteries for operation
Connection:	RJ45 (com). Digital I/O- RS485. 4 *RS232 COM-ports
Software functions:	Product type, temperature, water alarm, leak detection, programmable alarms, Inventory /delivery reports, alarm history
Web-application:	SiteVision® /TBA

16.5 Appendix IV: Declaration of Conformity.

Declaration of Conformity

We, **4tech AS**, declare under our reposibility that the **Automatic Tank Gauging System**:

Products: **FuelCom, Ex-modules, FuelBar, MiniBar, Ex cable, Thermistor-**
Models: **FC5080, AD424, RE202, PT100, IS485, FB410/420, P44 Tx, MiniBar, MiniBar P130-**

-complies with the ATEX directive 94/9/EC. Type examination certificates declares that 4tech AS ATGS system is in conformity with the ATEX directive as regards to essential health and safety requirements of European standards EN 50014, EN 50020, EN 50284, and EN 61000 used in Ex environment. Tests for electromagnetic compatibility EN 50081-1 and EN 50082-1 as regards to Non-Ex environment, and with NEK 420: 2007, 3rd edition as regards to installation of Electrical products in explosive areas. The Non-Ex products MiniCom 1010 and FuelCom 5040 complies with EMC directive 2004/108/EC

Product quality assurance notification number: NEMKO 99ATEX 2907Q (level Measuring System).

FuelCom 5080 **FuelCom 5040**	ATGS controller. EMC/ESD testing of FuelCom 5080, Report; 67422/2 Nemko Comlab-"Generic industry". Directive 2004/108/EC	EN 61000-6-1 EN 61000-6-3/A EN 61000-6-2 EN 61000-6-4
MiniCom 1010	ATGS controller. EMC/ESD testing of MiniCom 1010, Report; 85966/4 Nemko Comlab-"Generic industry". Directive 2004/108/EC	EN 61000-6-1 EN 61000-6-3/A EN 301489-1 EN 301489-7 EN 55022 (1998) CISPR 22
AD424	The AD424 is an intrinsically safe galvanic isolated 4-20mA input module, EC-type Examination Certificate number: DNV-2000-ATEX-OSL-0244 II 1G [EEx ia] IIC	EN 50014: 1997 + A1: 1999 +A2 EN 50020: 1994
RE202	The RE202 is an intrinsically safe galvanic isolated Relay output module, EC-type Examination Certificate number: DNV-2000-ATEX-OSL-0244 II 1G [EEx ia] IIC T_{amb} =50°C	EN 50014: 1997 + A1: 1999 +A2 EN 50020: 1994
PT100	The PT100 is an intrinsically safe galvanic isolated sensor input module, EC-type Examination Certificate number: DNV-2000-ATEX-OSL-0244 II 1G [EEx ia] IIB	EN 50014: 1997 + A1: 1999 +A2 EN 50020: 1994
IS485	IS power supply with galvanic isolated RS485 repeater, Test no. 2000-1368, EC-type Examination Certificate number: DNV-2000-ATEX-OSL-0244 II 1G [EEx ia] IIB/IIA	EN 50014: 1997 + A1: 1999 +A2 EN 50020: 1994
FuelBar 410/420	Fuel sensor. EC-type Examination Certificate Number; Nemko 99ATEX 219 II 1G Ex ia IIC T4, T60 °C	EN 60079-0:2006, EN 60079-11:2007 EN 60079-26:2004
P44 Tx	Fuel sensor. EC-type Examination Certificate Number; Nemko 99ATEX 219 II 1G Ex ia IIC T4, T60 °C	EN 60079-0:2006, EN 60079-11:2007 EN 60079-26:2004
MiniBar P130 **UC2**	Fuel sensor. EC-type Examination Certificate Number; ISSeP07ATEX003X/1 II 1G EEx ia IIC T6, T90 °C	EN 50014: 1997+A1, A2:1999 EN 50020: 2002, EN 50284:1999 EN 50281-1-1:1998+ A1: 2002
MiniBar **UC2**	Fuel sensor. EC-type Examination Certificate Number; ISSeP07ATEX003X II 1G EEx ia IIC T6, T90 °C EMC-test of MiniBar pressure transmitter Report number: 2002-3188	EN 50014: 1997+A1, A2:1999 EN 50020: 2002, EN 50284:1999 EN 50281-1-1:1998+ A1: 2002 EN 61000-6-2 2004/108/EC
Thermistor PTC level sensor	Simple apparatus. (Certificate not required, verified by 0470 Nemko) II 1G Ex ia IIB T3	EN 50014: 1997+A1…A2 EN 50020: 2002 EN 50284: 1999
Ex Cable	Datasheet- 4tech blue cable KEA-030 LIYCYöb 4x0,5m²	NEK 420, 3rd edition.

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www.4tech.no

Arild Ulleland,
4tech ATEX Compliance director

Date: Sept 9th, 2009

BL-021 4tech declaration of conformity REV 11.doc
BL-021 rev. D

Utarbeidet av: WB Godkjent av: AU

16.6 Appendix V: Product Quality Assurance Notification.

Nemko Worldwide Testing and Certification

[1] PRODUCTION QUALITY ASSURANCE NOTIFICATION

[2] Equipment or Protected System Intended for use
in Potentially explosive atmospheres
Directive 94/9/EC

[3]	Notification Number :	Nemko 99ATEX207Q
[4]	Equipment or Protective System or Components as listed:	Level Measurement System (ATGS: Automatic Tank Gauge System) ⟨Ex⟩ II 1/(1) G Ex ia; [Ex ia]
[5]	*Responsible Manufacturer*:	4tech ASA Solbråveien 49 N-1383 Asker NORWAY
[6]	*Factory:*	Same as Manufacturer

[7] Nemko AS, notified body number 0470 for Annex IV in accordance with Article 9 of Council Directive 94/9/EC of 23 March 1994 notifies to the applicant that the actual manufacturer has a production quality system which complies to Annex IV of the Directive.

[8] This notification is based on audit reports No 107334 issued the 2008-05-22 and 2008-06-13.

The notification can be withdrawn if the manufacturer no longer satisfies the requirements of Annex IV.

Results of periodical re-assessment of the quality system are a part of this notification.

[9] This notification is valid until 2011-07-31 and can be withdrawn if the Manufacturer does not satisfy the production quality assurance re-assessment.

[10] According to Article 10[1] of the Directive 94/9/EC the CE marking shall be followed by the identification Number 0470 identifying the notified body involved in the production control stage.

This certificate may only be reproduced in its entirety and without any change, schedule included.

2008-06-13

Rolf Hoel
Certification Manager, Ex-products

Nemko AS Gaustadalléen 30 P.O.Box 73 Blindern N-0314 Oslo Norway T +47 22 96 03 30 F +47 22 96 05 50 Enterprise number NO974404532

16.7 Appendix VI. Verification form for intrinsically safe installation of FuelCom 5080

Customer			**Installation site**			Gas class
Order number			**Project no.**			IIA T3
Signal amplifier/	intrinsically safe:		Equipment type:			To be defined
DATA:	Safety corrected values					To be defined
Max voltage	Uo (v) ≤		Data from signal module			To be defined
Max current	Io(mA) ≤		Data from signal module			To be defined
Max Power	Po(W) ≤		Data from signal module			To be defined
Max capacitance	Co (nF)=		Data from signal module			To be defined
Max inductance	Lo (mH)=		Data from signal module			To be defined
Field equipment	Pressure /temp. probe		Type of equipment			
DATA:	EX marking:	Ex classification				To be defined
Max input voltage	Ui (v) ≤		Data from probe			To be defined
Max current	Ii(mA) ≤		Data from probe			To be defined
Max power	Pi(W) ≤		Data from probe			To be defined
Nominal current	Ii (mA)=		Data from probe			To be defined
Int. capacitance	Ci (nF)					To be defined
Int. inductance	Li(mH)=					To be defined

Cable	Type:					To be defined

Data:			Installed length L:		m	Fill in:
Resistance:	Rcab(Ω/km)=		Sum Resistance Rc:		Ω	L/1000*Rcab*2
Capacitance	Ccab(nF/km)=		Sum Capacitance:		nF	L/1000*Ccab
Inductance	Lcab(mH/km)=		Sum Inductance:		mH	L/1000*Lcab
Control:	Product	Value	Requirements	Status (?)		
Feeding voltage			Uo<Ui			
Voltage loss	Cable		Rc*20mA			
Max. Capacitance	Cable+probe		Ccab+Ci< Co			
Max Inductance	Cable+probe		Lcab+Li< Lo			
Comment Min. operating voltage on probe: U>12V .						
CERTIFIED BY:						
Date:		Name:				
Approved by:			signature:			

This form is general. Data from the actual module, field equipment and cable used must be entered.

16.8 Appendix VII. Brochure.

Tank Monitoring System

FuelCom® 5080

By 4tech

Easy to install

Easy to use

Easy to upgrade

Well proven

CE

FuelCom® 5080

Power and flexibility

FuelCom® 5080 is an advanced control unit for the general tank monitoring market today, both within Ex areas as well as for non hazardous applications. It is built with the most updated components to support the existing and forthcoming challenges. Keywords are reliability, capacity and flexibility.
FuelCom® 5080 can act as a self standing device on small and medium sized unmanned sites, serving as monitoring system with POS interface, accessible from remote server applications. It can also be the heart of operations in larger scale sites, directly connected to the FuelWin® wet stock management system.

Product ID:	**FuelCom® 5080**
Input voltage:	230V AC/12V DC (Adapter included)
Battery backup:	N/A
Dimensions (WxHxD):	Housing: 35x27x5cm
Com port:	4*RS232/422/485
Environment:	0-45°C, indoor
Outdoor operation:	Approved cabinet (optional)
Integrated modem:	Analogue
User interface:	Push and scroll button LED indicators Display Buzzer
Tanks:	8 (max)
Storage:	Dataflash
Gauging principle:	Hydrostatic pressure
Preferred ext. probe:	FuelBar® 4..20mA

The control unit communicates with the rest of the world by a built in analogue modem, ISDN, external GSM modem or TCP/IP adapter. The FuelCom® control unit supports remote firmware upgrades. FuelCom® 5080 also introduces SMS communication: Send your request for level and receive the polling result within seconds on your private mobile phone. We make it easy.

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